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Eller

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[54] **CLAMPING DEVICE FOR USE IN SHARPENING SHEARS AND THE LIKE**

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[52] **U.S. Cl.** ..... **51/218 R**

[51] **Int. Cl.²** **B24B 3/52**

[58] **Field of Search** ..... 51/218 R, 218 A, 218 P

[56] **References Cited**

UNITED STATES PATENTS

359,533	3/1887	Convers	51/218 A
941,272	11/1909	Powell	51/218 A
980,654	1/1911	Mason	51/218 A
1,659,257	2/1928	Giampeter	51/218 A
3,574,268	4/1971	Buse	51/218 A

FOREIGN PATENTS OR APPLICATIONS

73,487	10/1916	Switzerland	51/218 A

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[57] **ABSTRACT**

A clamping device for use in sharpening shears and the like with a grinding wheel wherein the shear blade is adjustably and rigidly clamped onto a counterbalanced support member that is secured to a base member for free pivotal movement with respect thereto. The degree of free pivotal movement of the support member is adjustable such that the force of gravity permits the counterbalanced support member to assume any desired grinding angle.

6 Claims, 4 Drawing Figures

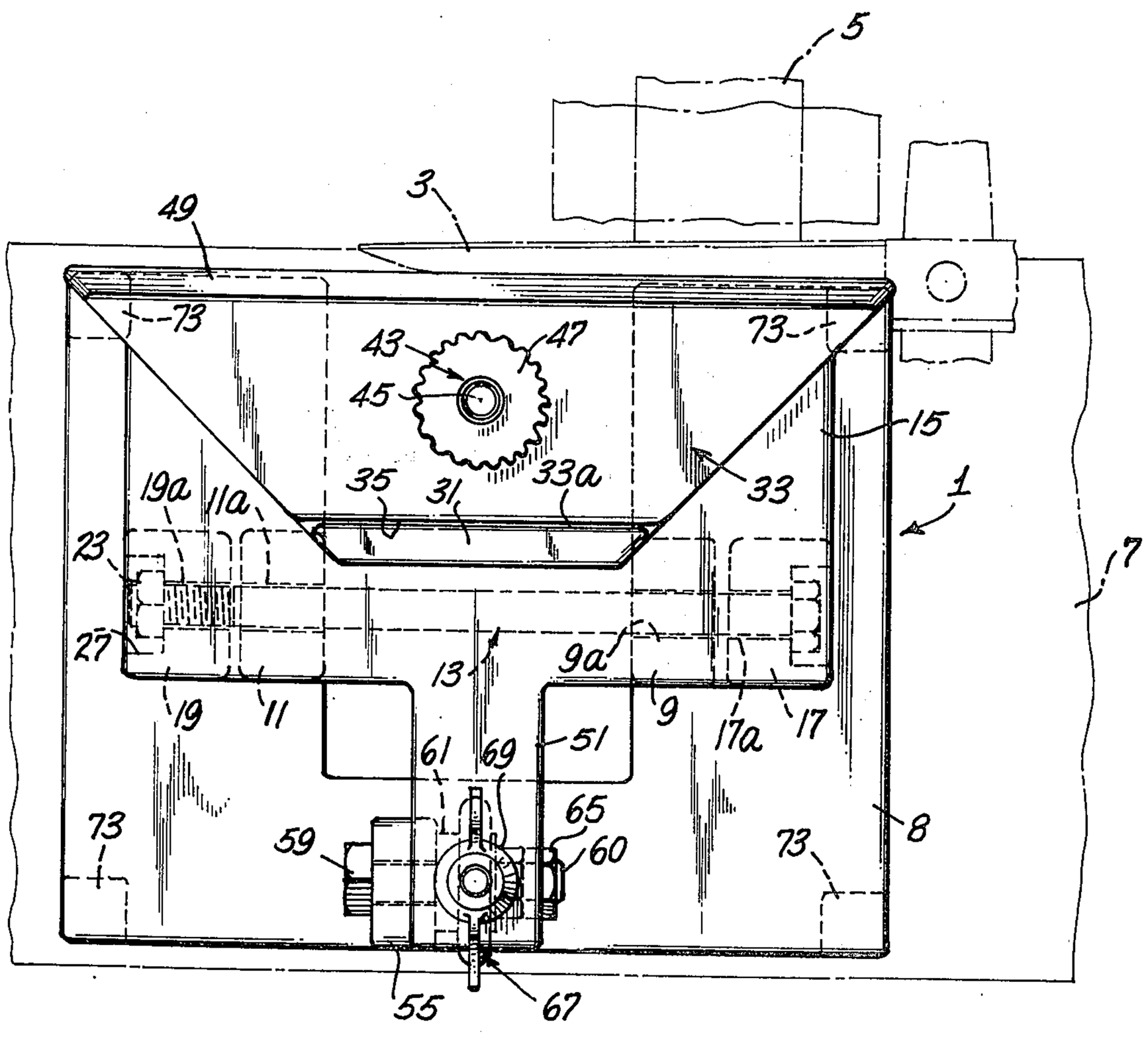
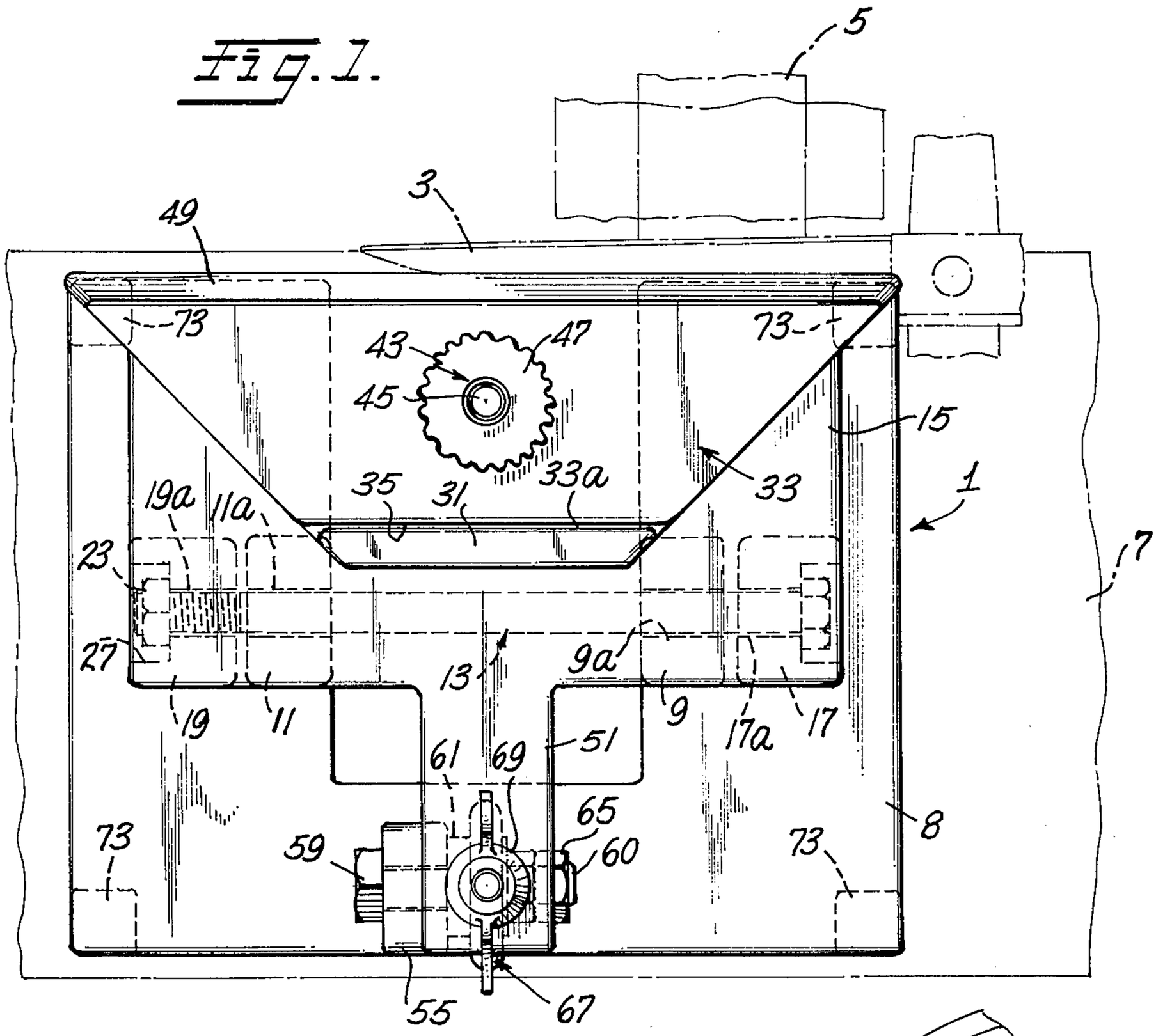


Fig. 1.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3
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43
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33a
35
31
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11a
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9a
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11
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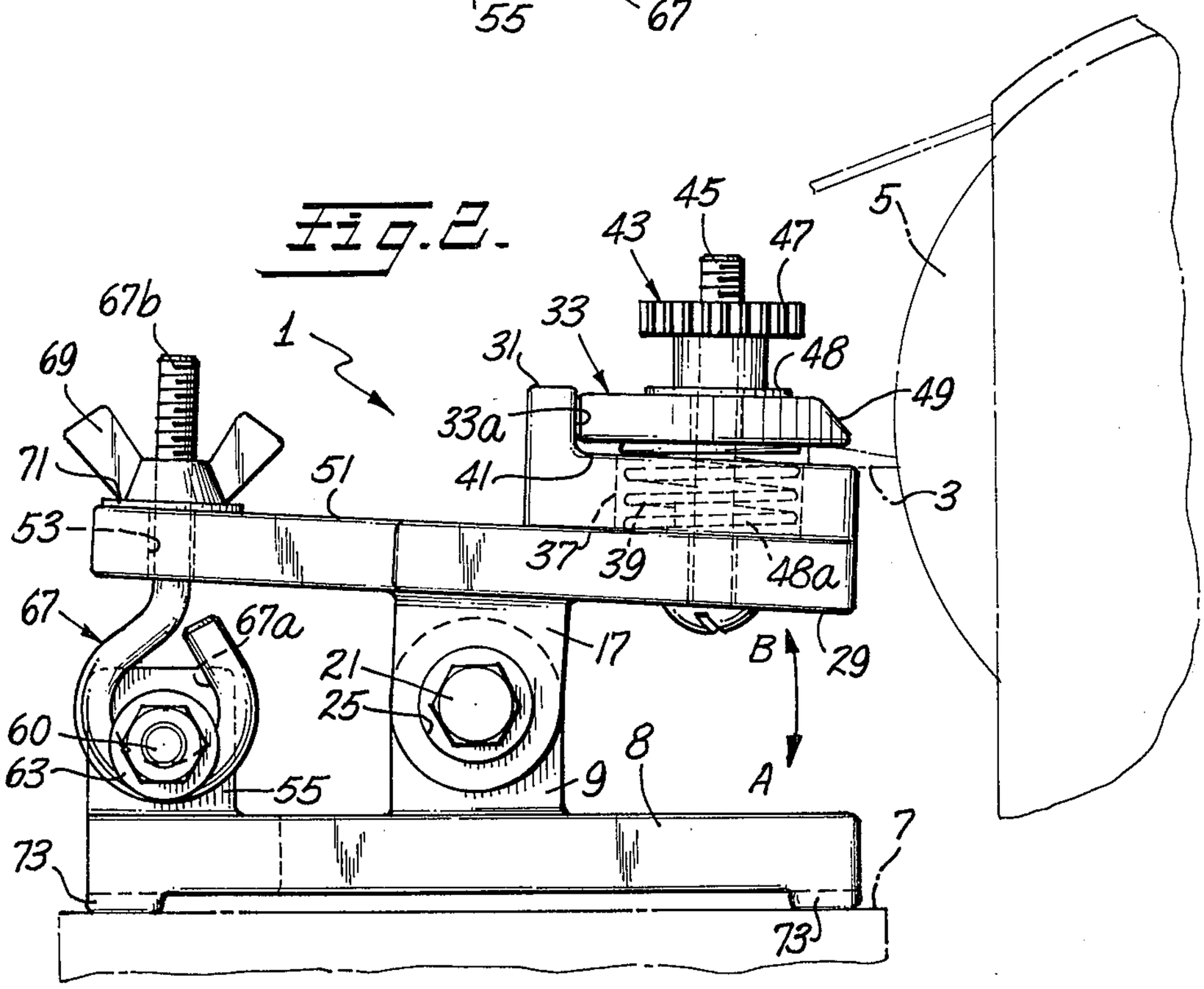
17a
17
61
69
51
65
59
60
73
8
55
67

Fig. 2.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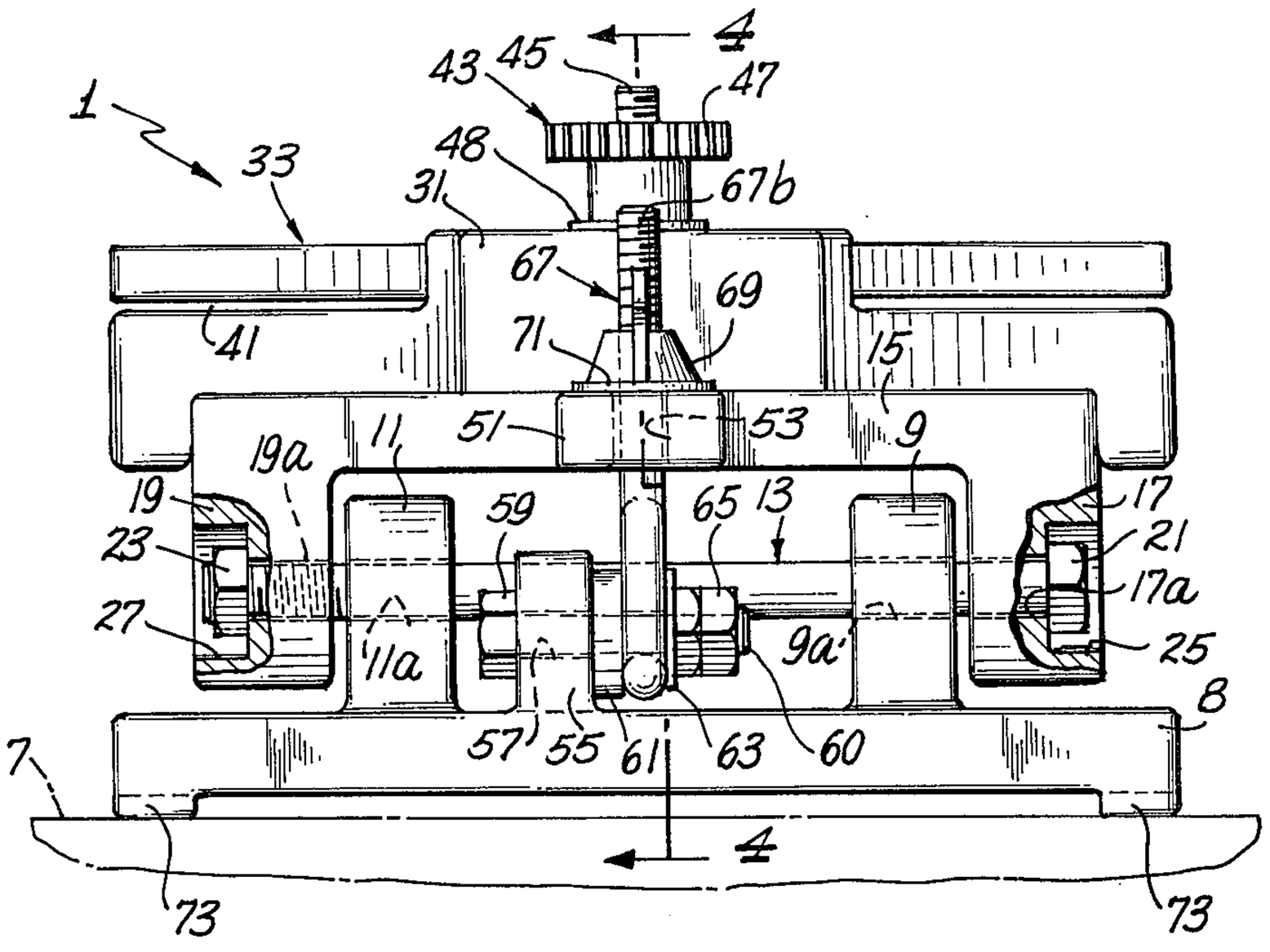
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59
65
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21
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11a
9a
17a
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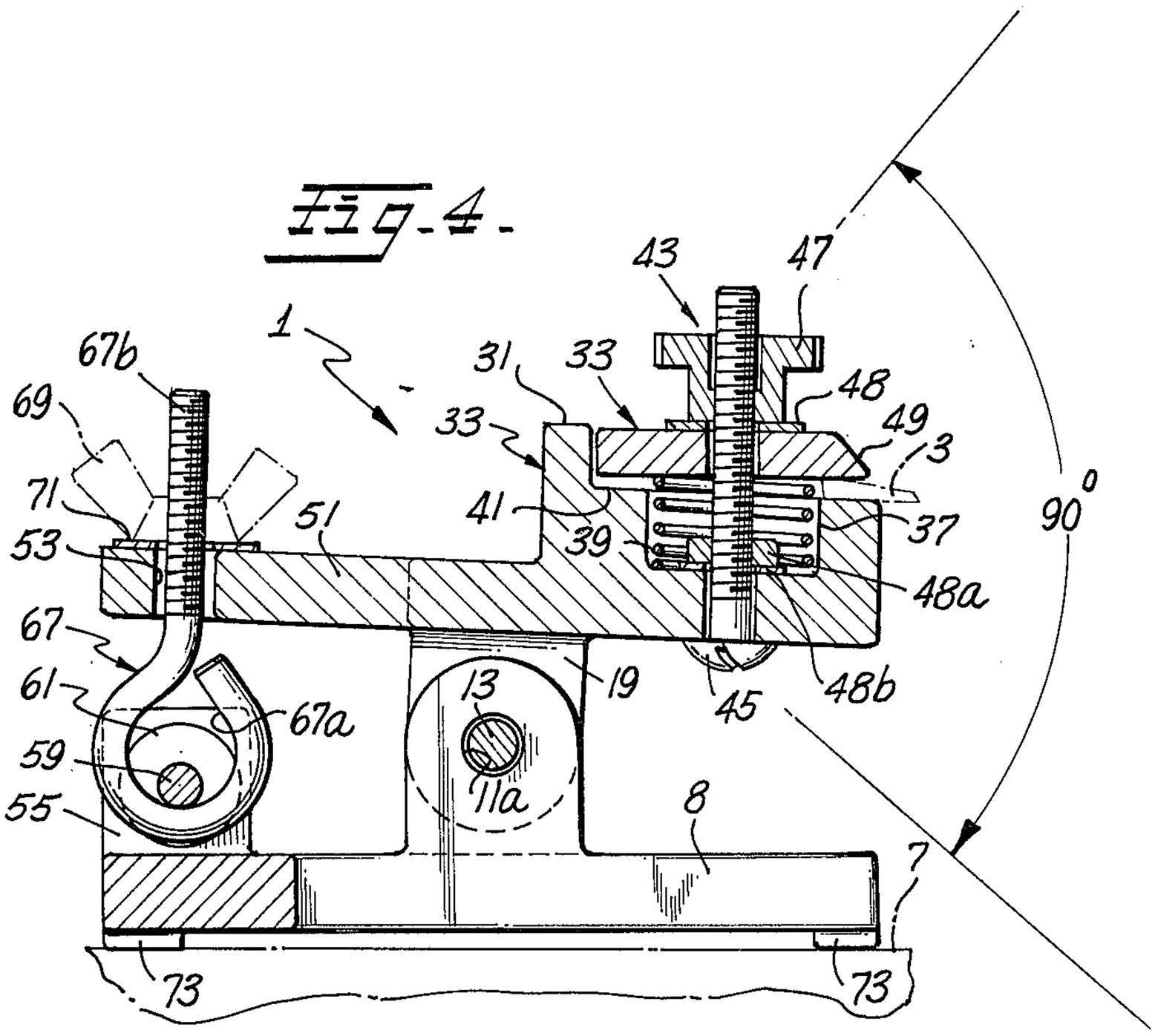
Fig. 3.

Fig. 4.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48b
67a
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11a
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CLAMPING DEVICE FOR USE IN SHARPENING SHEARS AND THE LIKE

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates generally to work holders for securing a tool that is being worked upon by a machine or similar such device. More particularly, the present invention is directed to a device for clamping the blade of a shear or similar tool for sharpening by means of a grinding or abrasive wheel. Such clamping devices are normally provided with certain adjustability features to permit the adaptation of the device to the specific structural configuration and required grinding angle of the shear blade being sharpened.

2. Description of the Prior Art

The prior art is replete with various forms of work holders or clamping devices whereby knife blades, sharp tools or shear blades may be secured for sharpening by means of a grinding or abrasive wheel. These devices manifest different forms of clamping arrangements for securing the blade to be sharpened to the general body of the device itself, and also various forms of provisions for adjusting the angular disposition of the blade with respect to the grinding wheel for achieving the optimum grinding angle.

Such prior art devices may generally be classified into two broad groups. First, there are those independent, manually held and guided clamping devices which are not structurally associated or physically integral with the grinding wheel apparatus. Secondly, there are those clamping devices which are integrally or structurally associated with the grinding wheel apparatus such that their manner of use is limited specifically to the configuration and mounting arrangement of the grinding wheels with which they are associated.

The main problems characteristic of work holders or clamping devices for securing a shear or similar blade to be sharpened by a grinding wheel are based primarily upon the manner in which the blade is clamped onto the device and the manner in which the grinding angle of the blade is adjusted with respect to the position of the grinding wheel in accordance with the blade's individual structure. There have been many prior art attempts to provide for a clamping device whereby the blade to be sharpened can be easily and rigidly secured to the device without loosening or twisting of either the blade or clamp mechanism during the grinding operation. In addition, such known clamping devices have also assumed various configurations in attempts to adapt them to a variety of individual blade shapes. These prior art clamping devices, be they independent or structurally associated with a grinding apparatus, normally are only operable with very basic and simple shear blade configurations and do not permit the effective clamping and sharpening of more complex shear blade structures such as those having a serrated or "pinking" edge configuration. Such prior art clamping devices further do not permit a very rigid and secure clamping of the blade with the usual result being that the blade tends to move or twist, thereby destroying the precise grinding angle required for proper sharpening.

The critical problem of adjusting the precise required angle of the clamped blade with respect to the grinding wheel so that effective sharpening can be achieved is difficult to solve. Heretofore known devices manifest various forms of adjustment structures for achieving

the desired grinding angle. However, the majority of these solutions are cumbersome, complex and expensive to produce. These devices are also almost invariably an integral part of the overall grinding apparatus since it has heretofore been difficult if not impossible to provide for an independent, manually operated clamping device which is both simple in structure and capable of precise grinding angle adjustment.

SUMMARY OF THE INVENTION

The clamping device of the present invention serves to overcome all the disadvantages and deficiencies inherent in the aforementioned known prior art devices. This is accomplished by providing for an improved clamping device which is in the form of an independent, manually held and operated unit that can be utilized with almost any known grinding or sharpening wheel apparatus. The clamping device of the instant invention includes a support member that is pivotally secured to a base member for free movement with respect thereto. The forward portion of the support member is structurally counterbalanced to pivot downwardly towards the grinding wheel. The rear portion of the support member is connected to the base member through an adjustment mechanism which permits the precise setting of the degree of free pivotal movement by the counterbalanced support member under the force of gravity, thereby setting the precise grinding angle. The shear blade is clamped upon the forward portion of the support member by a trapezoidal-shaped clamping plate which has one parallel side disposed adjacent an abutment formed in the support member to prevent twisting of the blade and subsequent loosening of the clamping plate due to the torque imposed upon the blade by the grinding wheel. The clamping plate is spring-biased away from the support member and pressed thereto by an adjustment mechanism which applies the clamping force on the blade to be sharpened. The forward parallel side of the clamping plate is provided with an edge forming an acute angle with the horizontal plane of the plate, thereby permitting clearance room for the grinding wheel during extreme angular adjustments of the pivotal support member.

It is therefore an object of the present invention to provide for a manually operated work holder or clamping device for securing a shear blade or the like at any given desired angle for sharpening by an independent grinding wheel.

It is another object of the present invention to provide for a clamping device which is capable of clamping a large variety of shear or similar blades of any given configuration for sharpening by a grinding wheel.

It is still another object of the present invention to provide for a clamping device for shears and the like which is extremely simple in structure and economical to manufacture.

It is yet another object of the present invention to provide for a clamping device which permits a rigid and secure clamping of a blade to be sharpened and the precise angular positioning of the blade with respect to the grinding wheel.

It is yet a further object of the present invention to provide for a clamping device wherein the precise grinding angle is achieved by a simple adjustment in conjunction with the force of gravity.

It is still yet another object of the present invention to provide for an independent, manually operated clamp-

ing device which can be adapted for use with a variety of grinding or sharpening wheel apparatus.

It is still yet a further object of the present invention to provide for a clamping device for shears and the like wherein the shear blade may be inserted and clamped within the device at any desired position without the possibility of the clamping mechanism being loosened by the torque imposed upon the blade during the grinding operation.

These and other objects of the present invention will be apparent from the following description and appended claims, reference being made to the accompanying drawings forming a part of this specification wherein like reference drawings designate corresponding parts in the several views.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of the clamping device of the present invention;

FIG. **2** is a side elevational view of the clamping device of FIG. **1**, as viewed from the right thereof;

FIG. **3** is a rear elevational view, partly in section; and

FIG. **4** is a vertical sectional view, taken along the staggered line **4—4** of FIG. **3**.

BRIEF DESCRIPTION OF THE PREFERRED EMBODIMENT

As depicted in FIGS. **1** and **2**, the clamping device **1** of the present invention is an independent, manually held and operated unit that is capable of rigidly clamping a shear blade **3** for sharpening by means of any conventional or well known grinding wheel **5**. Clamping device **1** may be supported for use by any suitable planar surface **7** in order that blade **3** may be positioned at the precise grinding angle with respect to grinding wheel **5**.

More particularly, clamping device **1** includes a base member **8** provided with upstanding flanges **9** and **11**, as indicated in FIG. **3**, having bores **9***a* and **11***a* formed therethrough, respectively. Pivotally secured to base member **8** by means of bolt **13** journalled within bores **9***a* and **11***a* is a support member **15** provided with downwardly depending flanges **17** and **19**. Bores **17***a* and **19***a* provided through flanges **17** and **19**, respectively, are aligned with bores **9***a* and **11***a* to receive the journalled ends of bolt **13** which is secured in place by means of its head portion **21** and threaded nut **23**. As shown in FIG. **3**, bolt head **21** may be enclosed within a recess **25** formed in flange **17** and threaded nut **23** may similarly be enclosed within a recess **27** formed in flange **19**. By this arrangement, support member **15** is capable of free pivotal movement with respect to base member **8**.

The forward portion **29** of support member **15** is structurally counterbalanced or weighted by an integral stepped flange structure **30** which is substantially trapezoidal in shape. In this manner, forward portion **29** of support member **15** will always be under the influence of gravity to pivot downwardly in the direction A as indicated in FIG. **2**. Supported upon flange **31** is a clamping plate **33** having a corresponding substantially trapezoidal configuration. The shorter parallel side **33***a* of plate **33** is disposed adjacent a longitudinal stepped vertical wall section **35** of flange **31** for substantially its entire length as indicated in FIG. **1**. Flange **31** is further provided with a recess **37** for receiving a coil spring **39** which serves to bias clamping plate **33** upwardly and away from upper surface **41** of flange **31**. A first adjustment mechanism in the form of nut and bolt assembly **43**, including threaded bolt **45**, thumb-screw nut **47**, washer **48**, lock nut **48***a* and washer **48***b* controls the spacing between clamping plate **33** and upper surface **41** of flange **31** for clamping shear blade **3** therebetween. Because of the corresponding tradezoidal configurations of both clamping plate **33** and upper surface **41** of flange **31**, an extremely strong and secure clamping action is imposed upon blade **3** when thumb-screw **47** is tightened downwardly, even if blade **3** is inserted and clamped at a non-parallel position with respect to the front edge of the clamping plate **33**. The other parallel side of clamping plate **33** is provided with a forward edge **49** which forms an acute angle with the horizontal plane of plate **33**, thereby permitting clearance room for grinding wheel **5** when the forward portion **29** of support member **15** is in an extreme position of downward adjustment. This is apparent from the arrangement depicted in FIG. **2**.

The rear portion of support member **15** may assume the configuration of a tab **51** having an aperture **53** therethrough. A third upstanding flange **55** on base member **8** is provided with an aperture **57** through which a threaded bolt **59** is loosely journalled. The threaded portion **60** of bolt **59** is provided with washers **61** and **63** and at least one nut **65**. As is evident in FIGS. **3** and **4**, a second adjustment mechanism including a threaded eye bolt **67** has its eye portion **67***a* secured by bolt **59** between washers **61** and **63** in a loose pivotal manner is provided at the rear portion of support member **15**. The threaded portion **67***b* of eye bolt **67** is passed through aperture **53** of tab **51** and secured in place by means of a winged lock nut **69** and associated washer **71**. In this manner, the degree of free pivotal movement of forward portion **29** and support member **15** about the axis of bolt **13** in the downward direction A can be limited by adjusting the position wing nut **69** on eye bolt **67**.

Base member **8** may be provided with legs **73** in the form of pads made from any suitable material such as plastic, rubber or metal, compatible with the sliding function of clamping device **1** across planar surface **7** during the sharpening operation. Further, base member **8**, support member **15** and clamping plate **33** may be made from any material found suitable for the manner in which clamping device **1** is to be used. Some examples of such materials are plastics and cast light metals, i.e. aluminum, magnesium or their alloys.

The nut and bolt assembly **43** and threaded eye bolt **67** may be substituted by any other suitable adjustment mechanisms well known in the art for performing the same functions. Likewise bolt **13** and bolt **59** may be alternatively replaced by rivets, rods or the like member well known in the art for performing the same functions as these devices.

BASIC MODE OF OPERATION

When it is desired to sharpen a pair of shears or the like, the shear blade **3** is placed upon the upper forward surface **41** of flange **31** in any desired position. The clamping plate **33** is then caused to press tightly upon the rear portion of blade **3** by adjusting thumb screw **47** downwardly. The grinding angle at which the blade edge **3** assumes with respect to grinding wheel **5** is set by turning wing nut **69** in the proper direction. In this manner, counterbalanced support member **15** will pivot downwardly in direction A under the force of

gravity if wing nut **69** is loosened. Alternatively, the forward portion **29** of support member **15** will pivot upwardly against the force of gravity in the direction B if wing nut **69** is tightened. Once the exact position of wing nut **69** is ascertained and set, the front portion **29** of support member **15** will always be biased downwardly in the direction A under the force of gravity, thereby causing tab **51** to press upwardly against washer **71** and wing nut **69.** When the precise grinding angle has been set according to this latter procedure, the entire clamping device may then be held manually and passed across the grinding wheel **5** for contact with the shear blade **3** to be sharpened as shown in FIG. **1.**

Because of the secure clamping force exerted by trapezoidal-shaped clamping plate **33** and opposed surface **41,** and the disposition of edge **33***a* adjacent edge **35,** the shear blade **3** will remain rigidly clamped, notwithstanding the torque imposed thereon by grinding wheel **5.** Also, because of the counterbalancing of front end **29** of support member **15,** the precise grinding angle will be maintained by virtue of the upward pressure of tab **51** against the preset washer **71** and wing nut **69.** Finally, the independent unit structure of clamping device **1** permits the clamping of any shape blade configuration for sharpening since the user merely moves the device **1** in any direction desired with respect to a fixed grinding wheel **5.** It is to be understood that the form of the invention herewith shown and described is to be taken as a preferred example of the same, and that various changes in the shape, size and arrangement of parts may be resorted to without departing from the spirit of the invention or scope of the subjoined claims.

I claim:

1. A freely movable and manipulable clamping device for use in sharpening shear blades and the like with a grinding wheel, which device comprises:

a. a base member;

b. a support member pivotally carried by the base member for free and unbiased pivotal movement with respect thereto, wherein the pivot point of the support member is disposed rearwardly of the center of gravity thereof to thereby provide a forward portion that is counterbalanced in a downward direction;

c. a clamping means carried by the forward portion of the support member, which clamping means includes:

i. a flange having a longitudinal wall section, and

ii. a detachable plate having a substantially isoceles trapezoidal configuration, wherein the shorter parallel side of the plate is disposed adjacent and parallel to the longitudinal wall of the flange and the longer parallel side overlaps the blade when the latter is in a clamped position; and

d. adjustable means for limiting the degree of free and unbiased pivotal movement of the support member with respect to the base member to thereby control the desired grinding angle between the blade edge and the grinding wheel.

2. The device of claim **1,** wherein the plate is spring-biased in an open position and adjustably secured to the support member by means of a first threaded bolt and nut assembly for applying pressure to the blade to rigidly secure it to the support member.

3. The device of claim **1** wherein the means for adjusting the degree of free pivotal movement of the support member includes a second threaded bolt and nut assembly for applying pressure to the rear portion of the support member in a downward direction.

4. The device of claim **1** wherein the longer parallel side of the plate is provided with a forward edge that forms an acute angle with the horizontal plane of the plate, thereby providing clearance for the grinding wheel during the sharpening operation.

5. The device of claim **1** wherein the degree of free pivotal movement of the support member is an arcuate path of approximately 90°.

6. The device of claim **1** wherein the flange has a trapezoidal configuration substantially corresponding to the trapezoidal configuration of the plate.

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